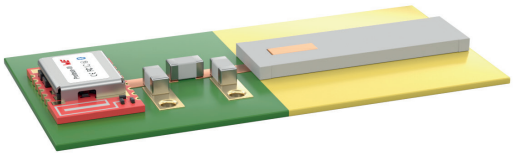
DESIGN AND SOLUTIONS
ANTENNA MATCHING



Radio module with chip antenna and matching circuit

What is antenna matching?

Antennas transmit and receive radio signals by converting electromagnetic conducted waves into free space waves and free space waves into conducted waves. In the process, an antenna forms electric and magnetic fields. The generated near field is influenced by the immediate environment. The main influencing factors are metals, batteries/accumulators, casings and human bodies. The position of the chip antenna on the PCB and the PCB size/geometry also affect the near fields, since the PCB together with the chip antenna creates the structure that operates as an antenna.

Due to the influencing factors, the frequency range at which the chip antenna can transmit and receive may be out of tune. With the help of RF inductors and RF capacitors, the chip antenna can be matched to the required frequency range.

The RF inductors and RF capacitors build a matching circuit that match the impedance of the chip antenna to the required frequency range under the influence of the immediate environment. Therefore, it is necessary to make an antenna match as soon as the chip antenna, the immediate environment, the required frequency range, the position of the chip antenna on the PCB or the PCB size/geometry changes. The specified antenna performance requires the correct implementation of the chip antenna for the application. More about this in our design-in guidance on our website.

Antenna matching:
www.we-online.com/antennamatching

Service Process

Our process enables transparent integration into your project plan. If you have any questions about the process or general questions about antenna matching, our service is also available to you.

- Get in touch with us via the online contact form on our website we-online.com/antennamatching
- We review your information and get back to you.
- Please have the following data ready for analysis:
  - **Antenna:** part number, required operating frequency range, required transmission range
  - **Radio Module:** part number
  - **PCB:** BOM, circuit diagram, layout (Gerber, Altium, KiCad, EAGLE), layer structure, layer material
  - **Application:** photos, casing information, immediate environment, environment
- We analyze your data and advise you.
- After successful analysis, the following materials will be required for antenna matching:
  - Complete series-ready application with housing and battery/accumulator
  - Two fully assembled PCBs on which the antenna is placed
  - A sample of the immediate environment to which the application is attached
  - Documentation of the assembly and disassembly of the application
- We match your antenna and send you a report.
- Your material will be returned.

SERVICES

- ✔ Advice on antenna selection
- ✔ Advice on antenna placement
- ✔ Advice on selection of the matching circuit for the antenna with RF-inductors and -capacitors
- ✔ Measurement of antenna S11 parameters: return loss (RL), voltage standing wave ratio (VSWR) and RL efficiency
- ✔ Antenna simulation models